

Review of: "A Proposed Secure Wearable Device Payment System Based on Blockchain Technology"

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Review: A Proposed Secure Wearable Device Payment System Based on Blockchain Technology

Abstract

The abstract provides a solid overview of the proposed secure wearable payment system, emphasizing the growing popularity of wearable technology and the security risks it faces. The authors highlight the integration of blockchain technology as a solution for securing transactions, offering benefits like decentralization, immutability, and enhanced security.

Recommendation: To make the abstract more comprehensive and impactful, it is recommended to include a brief mention of any experiments, simulations, or practical validation of the proposed system to strengthen the proposal's credibility. Additionally, the abstract should clarify how the system addresses technical challenges, such as key distribution, to better explain the technical approach. Finally, the contribution of the proposed system should be made more concrete by specifying whether it improves performance, reduces costs, or enhances scalability for wearable payment systems.

Introduction

The introduction highlights the rapid growth of wearable technology and its integration into financial technology (FinTech), while emphasizing the security risks, such as cyber-attacks and data breaches. The authors note that while IoT improves efficiency across industries, security remains a significant concern, especially in banking and payments. The introduction sets up the paper's proposal to use blockchain technology to address these security issues by providing a decentralized, secure system for wearable payments, highlighting blockchain's immutability and peer-to-peer transaction capabilities in securing IoT-based wearable systems.

Recommendation: The introduction could benefit from a clearer definition of the specific security challenges the paper addresses. Explicitly stating these challenges would improve precision. The relevance of blockchain should be emphasized earlier, with more detail on why it is uniquely suited for securing wearable payments beyond immutability and decentralization. Additionally, identifying the research gap this paper fills would make its contribution more prominent. A brief mention of global technological trends in blockchain and IoT would also help situate the solution within broader developments, making the introduction more focused and persuasive.

Statement of the Problem

In the "Statement of the Problem," the authors highlight the security vulnerabilities of wearable IoT devices, particularly in financial transactions, making them frequent targets for cyberattacks. Financial institutions using these devices are exposed to risks like data breaches, DoS attacks, and hacking. Additionally, as connected devices increase, scalability becomes a challenge for centralized systems. The authors propose blockchain as a solution to enhance security and scalability by decentralizing transactions and securing data with cryptographic methods.

Recommendation: The section could benefit from more precise details on specific security threats and their direct impact on financial institutions and wearable devices. Providing concrete examples or data would strengthen the urgency of addressing these issues. The scalability discussion could also be expanded by detailing how centralized systems struggle to meet IoT demands. A smoother transition from the problem statement to the proposed blockchain solution, with a clearer connection between identified issues and blockchain's advantages, would enhance the logical flow and make the statement more compelling.

Literature Review

The Literature Review provides a broad exploration of key concepts and technologies related to the proposed system, including IoT, wearable devices, and blockchain. It discusses how these technologies have evolved and been applied in financial services, with a focus on mobile and contactless payments. The review covers recent studies on NFC, biometric authentication, and highlights challenges like security vulnerabilities and scalability in IoT-based wearable payment systems. Blockchain is identified as a promising solution to these issues, with the review citing studies that demonstrate its potential to enhance security and reduce dependence on centralized systems.

Recommendation: The literature review would benefit from a more focused approach, as the discussion can be too general at times. Highlighting gaps in existing research and addressing the limitations of prior blockchain implementations in wearable payment systems would improve clarity. Additionally, more in-depth comparisons between blockchain and alternative technologies like NFC and biometric solutions would better justify blockchain as the superior choice. Lastly, improving the flow between sections would create a stronger narrative, connecting the challenges of IoT and wearable technology to the proposed blockchain solution.

Studies on wearable devices payment system

The Studies on Wearable Devices Payment System section reviews several key research efforts focused on the adoption and security of wearable payment technologies. It covers the use of NFC (Near Field Communication) and biometric authentication in payment systems, exploring factors that influence user adoption, such as perceived ease of use, security, and risk. The section highlights relevant studies demonstrating the growing interest in wearable payment systems across various industries, including banking and retail.

Recommendation: The section could be made more concise by focusing on the most relevant studies that directly relate to the integration of blockchain into wearable payment systems. Additionally, it would benefit from a clearer identification of the gaps in existing wearable payment systems that blockchain aims to address, such as security vulnerabilities and

scalability challenges. This would provide a more direct connection to the paper's proposed solution.

Studies on IoT

The Studies on IoT section explores the role of the Internet of Things (IoT) in wearable technology and payment systems. It discusses the rapid growth of IoT devices in various industries and their impact on improving connectivity, efficiency, and automation. The review touches on IoT's influence in sectors like smart homes and smart cities but emphasizes its relevance to the financial industry. The authors highlight the challenges IoT-based systems face, such as security threats, data privacy, and scalability issues, particularly in financial transactions.

Recommendation: This section could be shortened by focusing primarily on IoT studies that directly pertain to wearable payment systems, rather than broader IoT applications. More emphasis could be placed on the specific security and scalability limitations of IoT in financial contexts, and how blockchain technology has been proposed as a solution to these issues. A stronger link between IoT challenges and the blockchain-based wearable payment system proposed in the paper would improve coherence and relevance.

Studies on Blockchain Technology

The Studies on Blockchain Technology section provides a detailed review of blockchain's application across industries, particularly its role in enhancing security, transparency, and decentralization. The authors highlight blockchain's strengths—immutability, distributed ledger technology, and cryptographic security—and how these features address vulnerabilities in centralized systems, such as single points of failure and cyberattacks. The review focuses on blockchain's growing use in FinTech, showcasing its ability to secure transactions, reduce costs, and eliminate intermediaries. Several studies are referenced, demonstrating blockchain's successful deployment in IoT networks, cryptocurrency, and decentralized financial services, positioning it as a strong solution for securing wearable payment systems.

Recommendation: The review could be enhanced by deepening the analysis of blockchain's limitations in real-world financial applications, particularly in terms of transaction speed, energy consumption, and integration with existing infrastructures. Highlighting these challenges would make the paper's contribution—specifically how the proposed wearable payment system overcomes or mitigates these limitations—more compelling. Additionally, the literature review would benefit from a sharper focus on blockchain implementations that are specifically relevant to IoT and wearable technology, drawing clearer connections to the proposed system. This would strengthen the argument for why blockchain is the optimal solution for wearable payment systems.

Conceptual Framework

The Conceptual Framework section outlines the proposed system's architecture, integrating blockchain technology to secure wearable payment devices. The framework emphasizes the end-to-end security of financial transactions by leveraging blockchain's decentralized ledger, ensuring data integrity, immutability, and transparency. It describes the system's key components, including the application layer (user interface), the security layer (blockchain for transaction recording), and the communication layer (Wi-Fi, Bluetooth, or NFC for data transfer between the wearable device and

banking systems). The framework aims to enhance security, scalability, and user trust in wearable payment systems.

Recommendation: The conceptual framework could benefit from a clearer explanation of the specific interactions between the system's layers and how blockchain directly enhances each layer's security. A more detailed comparison with existing frameworks could also strengthen the argument for why this approach is superior in addressing security and scalability challenges in wearable payments.

References

The References section provides a wide range of sources, covering key studies on wearable payment systems, IoT, and blockchain technology. The authors cite recent and relevant works, ensuring the paper is grounded in current research and technological developments. The references include a mix of foundational studies and newer contributions, particularly in blockchain applications for FinTech and IoT security.

Recommendation: The references could be improved by ensuring a stronger focus on studies directly related to blockchain integration in wearable payment systems. Some citations appear broader or tangentially related to the core focus of the paper. Prioritizing highly relevant sources and including more peer-reviewed studies on blockchain's specific applications in IoT-based payment systems would further solidify the academic grounding of the paper. Additionally, it is recommended that more recent studies from the past few years be included to reflect the latest advancements in blockchain technology, IoT, and wearable payment systems. Incorporating up-to-date sources would enhance the paper's relevance and credibility, ensuring that it aligns with the most current research and emerging trends in securing wearable payment systems.

Summary:

The paper proposes a secure wearable device payment system based on blockchain technology. It addresses the growing concerns of security vulnerabilities in IoT-based wearable payment systems, such as data breaches and cyberattacks. The authors suggest that blockchain's decentralized, immutable ledger can enhance the security of financial transactions while addressing scalability issues inherent in centralized systems. The proposed system integrates elliptic curve cryptography (ECC) with blockchain to further secure communication, providing an end-to-end security solution. The paper reviews relevant literature on IoT, wearable payment systems, and blockchain, and presents a conceptual framework for the system's architecture.

Recommendations:

- **More Focused Literature:** The literature review should focus more on blockchain applications in wearable payment systems, rather than broad topics. Recent studies should also be incorporated to ensure the paper reflects current technological advancements.
- **Technical Clarifications:** The conceptual framework could benefit from a clearer explanation of how blockchain enhances security at each system layer and a comparison with existing solutions.
- **Practical Validation:** The proposed system would be strengthened by including experimental or practical validation to

demonstrate its effectiveness and usability in real-world scenarios.

- Updated References: More recent and highly relevant peer-reviewed sources should be prioritized in the references to bolster the paper's academic credibility and ensure it is grounded in the latest research.